Bayesian Analysis of Computer Code Outputs

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Abstract

Over the last 6 to 8 years Bayesian statistical methods have been developed that can carry out sensitivity and uncertainty analyses using orders of magnitude fewer model runs than other methods. This tutorial will address the following questions:

- How do these methods work?
- How do they achieve such dramatic improvements?
- What more can they do beyond the familiar techniques of SA/UA?
- What is required in order to implement them?

The presentation will draw on a number of practical examples to illustrate the methods.

Keywords: Bayesian statistics, Bayes linear methods, calibration, data assimilation, dynamic model, emulator, Gaussian process, interaction, model correction, model criticism, model uncertainty, sensitivity analysis, uncertainty analysis, validation, value of information.